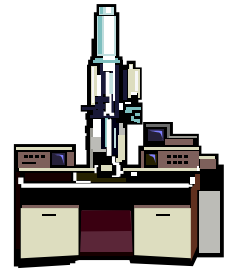


TECH TREK Identification Key

Teachers' Guide

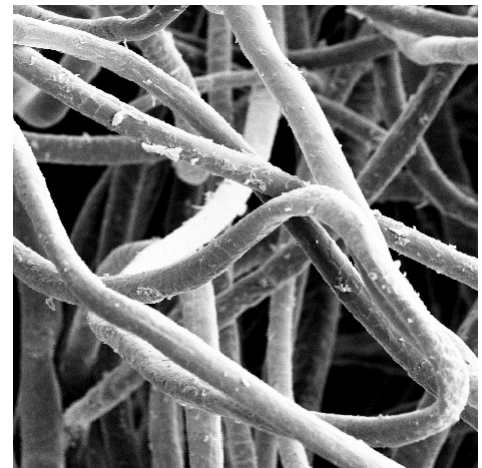
Objectives:

- Create and use categories to organize a set of objects, organisms or phenomena (S4-1).
- Use a simple key to distinguish between objects (S4-4, S6-1).
- Distinguish between living and nonliving things and provide justification for these distinctions (S4-18).
- Devise a classification system for a set of objects or a group of organisms (S9-1).
- Distinguish between observation and inference given a representation of a scientific situation (S9-2).
- Compare and contrast the characteristics of plants and animals (S9-14).



Strategies:

- This is a simple key to help middle school students distinguish between living and nonliving things and between plants and animals. This key is not intended to be complete or the only possibility. This key is geared toward the specimens we already have and can identify using our equipment. Monerans and protista have been beyond our capabilities, thus far. You could provide additional keys for further identification, particularly with rocks and minerals.
- Lower grades can develop a simpler key using a tree diagram. Upper grades should develop and use a more advanced key. Students can review published keys for more detailed identification of insects, etc. Upper students should, as a follow-up, create their own keys to identify something of interest to them, such as clothing, music genres, or skateboard styles.
- This activity can be replicated using classroom materials and specimens easily gathered by teachers and students. The SEM adds a sense of mystery since it is a tool not usually available to schools. The SEM also improves the activity since students can magnify to the cellular level with ease. A teacher can substitute for the SEM using light microscopes or SEM micrographs available on the TECH TREK CD. (See the

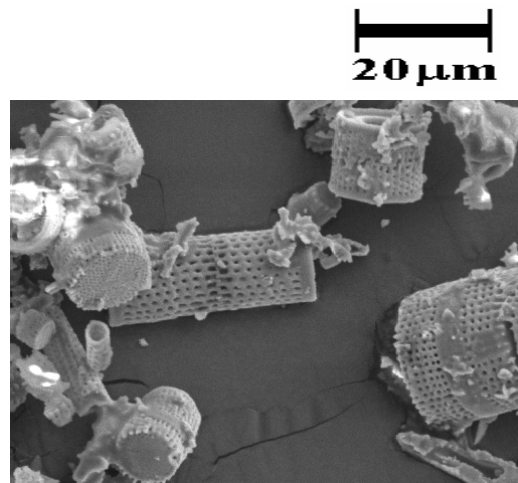


100 μm

image from a wool sweater, at right.)

- For additional excitement, specimens can be reduced to fragments that are not readily identifiable. Students can pretend to be criminal investigators documenting what is found at a crime scene.
- Secondary students should be challenged, after the activity, to distinguish between observations and inferences made during the activity. For example, they may observe that a specimen has 5 legs and a socket for a 6th leg. They may infer that the specimen is an insect. They may observe that at 100X, the specimen composed of fibers with periodic rings. They might infer that it looks like the SEM pictures of human hair from the Pantene Pro V commercials. They may observe with a microscope that fragments of a rock have cellular structure in a repeated pattern. (See the picture of diatoms below right.) They may infer that these are fossils of creatures that were once alive.
- Mature students can be assigned a project to research the differences between plants and animals. Less ready students can write about the differences between living and non-living things. Some examples of each type of report can be shared with the class.

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TECH TREK Identification Key

NAME _____



WHAT COULD IT BE?

1. a. Has legs, breathing apparatus, leaves, or cells of varying shapes and sizes. LIVING. Go to 2.
 1. b. No signs of life. If cells are present, they are regularly spaced as if made in a factory. NON-LIVING. Go to 7.
2. a. Has legs or active method of movement. Breathes oxygen. Exhales CO₂. ANIMAL. Go to 3.
 2. b. No active method for movement. Go to 6.
3. a. Has backbone. VERTEBRATE. Is it a fish, amphibian, reptile, dinosaur, bird, or mammal? What kind?
Stop.
3. b. No backbone. INVERTEBRATE. Go to 4.
4. a. Has exoskeleton like an insect or spider. ARTHROPOD. Go to 5.
4. b. Only one cell. CELL. Is it a virus, bacterium, protozoan or a cell from a more complex animal? Stop.
4. c. Is it soft and mushy like a worm? WORMLIKE ANIMAL. Is it a worm, slug, squid, octopus, or something else? Stop.
5. a. Does it have six legs? INSECT. Is it an ant, bee, fly, moth, beetle, or something else? Stop.
5. b. Does it have four pairs of legs? ARACHNID. Is it a spider, mite, or something else? Stop.
5. c. Does it have four pairs of walking legs with another pair modified for catching prey? CRUSTACEAN. Can you identify which type? Stop.
5. d. Does it have ten legs or more? MYRIAPOD. Is it a centipede, millipede, or something else? Stop.
6. a. Does it use photosynthesis to capture energy from the sun? PLANT. What kind of plant is it? Stop.
6. b. Does it decay other organisms or wastes to make energy? FUNGUS. What kind? Stop.
7. a. Does it appear manmade, such as a manufactured product? MANMADE. What does it appear to be?
Stop.
7. b. Does it appear natural? Go to 8.
8. a. Does it look like a rock or a mineral? ROCK. Can you identify it? Stop.
8. b. SOMETHING ELSE! What do you think it is? Stop.

OBJECT #1. It looks like _____ I think it is a _____ Why?

OBJECT #2. It looks like _____ I think it is a _____ Why?

